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TOXICOLOGY DETACHMENT

INDUSTRIAL HYGIENE EXPOSURE ASSESSMENT OF JP-8 PLUS 100 AT KINGSLEY FIELD

J. BELL
D. MATTIE
W.W. JEDERBERG
K.R. STILL

JANUARY 1998

REPORT FOR PERIOD MAY 1995

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NAVAL MEDICAL RESEARCH INSTITUTE
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NMRI-95-115

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FOR THE COMMANDING OFFICER

KENNETH R. STILL, CAPT, MSC, USN
Officer-in-Charge
Naval Medical Research Institute Detachment (Toxicology)

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J. Bell, D. Mattie, W. W. Jederberg, K.R. Still

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Naval Medical Research Institute Detachment Toxicology, NMRI/TD, 2612 Fifth Street, Building 433, Area B, Wright-Patterson AFB, OH 45433-7094

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13. ABSTRACT *(Maximum 200 words)*

The Occupational Medicine Division of Armstrong Laboratory Occupational and Environmental Health Directorate (AL/OEM) was requested by AL/OET, Tri-Service Toxicology Consortium and sponsored by NMRI/TD to perform an exposure assessment on workers handling the new jet fuel, JP-8 Plus 100. Six areas of concern were addressed during this exposure assessment. These areas included personnel in the flightline, Aerospace Ground Equipment (AGE) repair, Jet Engine repair. Fuel Cell repair, Petroleum-Oils and Lubricants. Included were personnel exposed to both exhaust and raw fuel.

A total of 40 area and breathing zone air samples were collected and analyzed from the six areas of concern during 22 May and 25 May 1995. VM & P naptha, benzene, nitrogen dioxide, toluene, and xylene samples were analyzed by Armstrong Laboratory Aldehydes, polyaromatic hydrocarbons and summa canister samples were analyzed using Galson Laboratories.

No exposures above currently permitted levels were detected. Data from the summa canisters provided results that are relatively close. However, methylene chloride is at least 70 percent high in JP-8 Plus 100 than in JP-8.

Recommendations were made to reduce the exposure of workers to the fuel and additive package.

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PREFACE

Industrial Hygiene Exposure Assessment of JP-8 Plus 100 at Kingsley Field

J. Bell [1], D. Mattie[1], W. Jederberg[2], and K.R. Still[2]

[1]Toxicology Division, Armstrong Laboratory, Wright-Patterson Air Force Base, OH 45433-7400
[2]Naval Medical Research Institute Detachment (Toxicology), Wright-Patterson Air Force Base, OH 45433-7903

This research describes methods and results of the Industrial Hygiene Exposure Assessment of JP-8 Plus 100 conducted at Kingsley Field under the sponsorship of the Naval Medical Research Detachment (Toxicology).

This work was supported by the Naval Medical Research and Development Command, Research Task No. N6422395MP0046. The opinions contained herein are those of the authors and are not to be construed as official or reflecting the views of the navy Department or the naval Service at large. This information was previously presented in an Air-Force consultative letter (AL/OE-CL-1995-0208). It is presented here to assure complete documentation of task completion.

LIST OF ACRONYMS

ACGIH	American Conference of Governmental Industrial Hygienists
AGE	Aerospace Ground Equipment
BHT	butylated hydroxytoluene
COT	Committee on Toxicology, National Research Council
JP4	Jet Fuel to compare data to
JP8	New Jet Fuel: Test Article for the Research
JP8+100	New Jet Fuel Plus the Additive: Test Article for the Research
OELs	Occupational Exposure Limits
OSHA	Occupational Safety and Health Administration
PAHs/PNAs	polyaromatic hydrocarbons/polynuclear aromatic hydrocarbons
POL	Petroleum-Oils and Lubricants
PPE	personal protective equipment
TWA	Time Weighted Average
Wright Patterson AFB	Wright Patterson Air Force Base: Dayton, OH

DEPARTMENT OF THE AIR FORCE
ARMSTRONG LABORATORY (AFMC)
BROOKS AIR FORCE BASE, TEXAS

25 Jul 95

MEMORANDUM FOR: AL/OET
Bldg 79
2856 G Street
WPAFB, OH 45433-7400

114 FS/CC
222 Arnold Ave
Klamath Falls, OR 97603-1925

FROM: AL/OEMI (Capt Bell)
2402 E Drive
Brooks AFB TX 78235-5114

SUBJECT: Consultative Letter, AL/OE-CL-1995-0208, Industrial Hygiene Exposure Assessment of JP-8 Plus 100 at Kingsley Field.

1. Introduction:

a. Purpose: The Occupational Medicine Division of the Armstrong Laboratory Occupational and Environmental Health Directorate (AL/OEM) was requested by AL/OET, Tri-Service Toxicology to perform an exposure assessment of workers handling the new jet fuel, JP-8 Plus 100.

b. Problem: The Fuels Branch of Wright Laboratory at Wright-Patterson AFB is developing a more thermally stable JP-8 jet fuel referred to as JP-8 +100. This new version of JP-8 is achieved by the addition of additives. The Tri-Service Toxicology Division is currently looking at the chemical composition of the additives for potential health effects. In order to conduct a risk assessment for JP-8 +100, exposure data is necessary. In addition, due to new occupational health concerns encountered during the conversion from JP-4 to JP-8, it would be advantageous to compare JP-8 +100 with combustion exposure data collected for JP-8. Kingsley Field is the first test base for the new JP-8 +100 jet fuel. Flightline and fuels personnel are exposed to both exhaust and raw fuel vapors. These exposures have not been sampled and quantified.

c. Scope: Six areas of concern were addressed during this exposure assessment. These areas included flightline personnel, Aerospace Ground Equipment (AGE) repair, Jet Engine repair, Fuel Cell repair, POL personnel, and a jet engine exhaust study. These areas were chosen so a representative exposure assessment could be done for the personnel working with and around JP-8 +100 jet fuel.

2. This survey was accomplished between 22 May 95 and 25 May 95 by:

Capt John Bell, Jr., Industrial Hygiene Consultant
TSgt Michael Lazenby, Industrial Hygiene Technician
SrA Christiann Pagan, Industrial Hygiene Technician

3. The following Kingsley Field personnel were contacted:

Col Powell, Squadron Commander
Maj Elvin, Aircraft Maintenance Officer
MSgt Bixler, Bioenvironmental Engineer Technician
MSgt Langford, AGE Shop Supervisor
MSgt Lewis, POL Shop Supervisor
TSgt Cruz, Fuel Cell Shop Supervisor

4. Survey Protocol:

a. Personnel breathing zone air samples were collected on crew chiefs during early morning and afternoon engine run-ups. These samples were analyzed for aldehydes, VM & P naphtha, benzene, nitrogen dioxide, toluene, xylene, and polyaromatic hydrocarbons. Breathing zone air samples were also collected on POL and AGE personnel to determine their exposures to JP-8 + 100 fuel vapors. The AGE samples were analyzed for VM & P naphtha, benzene, aldehydes and polyaromatic hydrocarbons. The POL samples were analyzed for VM & P naphtha, and benzene. Area air samples were collected at the rear of the F-16's during run-up for both JP-8 and JP-8 +100 aircrafts using a summa canister. These samples were analyzed for aldehydes, VM & P naphtha, benzene, nitrogen dioxide, toluene, xylene, and polyaromatic hydrocarbons. This was done to determine if there are significant differences between combustion by-products of the two fuels. The temperature was between 61 °F and 72 °F while sampling and the altitude is 4100 feet above sea level. See attachment 2 for weather conditions.

b. Collection and Analyses:

(1) A total of 40 area and breathing zone air samples were collected. The VM & P naphtha, benzene, nitrogen dioxide, toluene, and xylene samples were analyzed by Armstrong Laboratory. The aldehydes, polyaromatic hydrocarbons and summa canister samples were analyzed using Galson Laboratories. All samples were analyzed using approved methods and compared to OELs in Table 1.

(2) The Air Force Occupational Exposure Limits (OELs) for each potential hazard is listed in Table 1. The OELs are based of the requirements of AFOSH Standard 48-8, Controlling Exposures to Hazardous Materials, as defined in paragraph 1m.

Table 1.
Air Force Occupational Exposure Limits (OELs)

COMPOUND	OEL (mg/m3)	SOURCE[1]
Acetaldehyde	45.0 C[2]	ACGIH
Acetone	1780.0	ACGIH
Benzene	3.0	OSHA
Formaldehyde	0.37 C[2]	ACGIH
Methylene Chloride	174 .0	ACGIH
Nitrogen Dioxide	1.8	OSHA
Toluene	188.0	ACGIH
VM & P Naphtha	350.0	COT
Xylene	434.0	ACGIH

[1]Sources:
ACGIH - American Conference of Governmental Industrial Hygienists 1994-1995 Threshold Limit Values for Chemical Substances and Physical Agents and Biological Exposure Indices
OSHA - Occupational Safety and Health Administration Permissible Exposure Limits
COT - Committee on Toxicology - National Research Council

[2] Denotes ceiling value.

5. Survey Observations and Results:

a. AGE Shop:

(1) This shop has a room which was designed to allow for the maintenance and run-up of A/M 32A-60B generators inside. The room is equipped with a ventilation duct which is lowered over the engine exhaust pipe. Thirty minute area and breathing zone air samples were collected while a JP-8 +100 fueled generator was run-up. The samples were analyzed for VM & P naphtha, benzene, aldehydes, and polyaromatic hydrocarbons/polynuclear aromatic hydrocarbons (PAHs/PNAs). All of the samples revealed none detected and are well below the Occupational Exposure Limits (OELs) for each of the chemicals sampled. See sample results at attachment 1.

(2) A/M 32A-60B generators were also run-up outside for 32 minutes and area samples were collected. Because of the strong winds, the generators were positioned on the down-wind side of the building. These samples were analyzed for VM & P naphtha, benzene, aldehydes, polyaromatic hydrocarbons, polynuclear aromatic hydrocarbons (PAHs/PNAs). All of the samples revealed none detected and were well below the OELs for each of the chemicals except for formaldehyde. The formaldehyde Time Weighted Average (TWA) was 0.00007 mg/m^3. This is still well below the OEL ceiling of 0.37 mg/m^3 for formaldehyde. See sample results at attachment 1.

b. Jet Engine Shop: At the time of our assessment, no shop maintenance was being performed in this area. However, we talked to one shop worker about personal protective equipment (PPE) worn while working. Most of the time no PPE is worn while working in and around JP-8 +100 jet fuel because they limit dexterity. Magic Glove barrier cream is sometimes used (without gloves). Since JP-8 +100 doesn't volatilize as quickly as JP-4, skin contact could more readily cause dermatitis if not quickly washed off.

c. Fuel Cell Shop: No fuel tanks were available for maintenance repair during the time of our assessment. We did talk with the shop supervisor and personnel about any health concerns they had. They were very knowledgeable about PPE requirements when working with JP-8 +100. MSgt Bixler will do some sampling for VM & P naphtha, benzene and butylated hydroxytoluene (BHT) when work comes in to ensure workers are not being overexposed.

d. POL Shop:

(1) Breathing zone air samples were taken during tanker off-load, sample pull, refilling tankers and aircraft refueling. These samples were analyzed for VM & P naphtha, toluene, xylene, hexane and benzene. MSgt Bixler has agreed to conduct additional air sampling for BHT as the necessary media was not available during our survey. The sample results are at attachment 1.

(2) Personnel were sampled during tanker off-loading. During the sampling, several valves and hoses were repositioned and inspection ports were opened for visual inspection. Two personnel were sampled for 27 minutes each. The sample results are at attachment 1 and reveal TWA exposures well below the OELs for each chemical. The analytical result was none detected for each of the chemicals.

(3) During a sample pull, samples are pulled from three transporters and quality checks are performed to ensure fuel quality. Each transporter takes approximately 10 to 15 minutes to complete. One person was sampled for 15 minutes. The sample results showed his exposure was well below the OEL for each of the chemicals. The sample results are at attachment 1. The sample result was none detected for each of the chemicals.

(4) To add the + 100 additive to the JP-8 fuel, a closed-loop injection

pump is used. The potential exposure comes from connecting hoses and while checking the additive reservoir prior to refueling. One worker complained of having occasional headaches after checking the reservoir and when manually adding the additive to the transporters. The refueling process takes approximately 15 minutes to complete. Air sampling revealed none detected with the exposure, well below the OEL for each of the chemicals.

(5) Finally, during aircraft refueling workers could potential be exposed to jet fuel while connecting hoses and venting. The refueling time is varied, however during our 48 minute sample, all chemical results came back with none detected. Workers exposures are well below the OELs for each chemical sampled.

e. Flightline Personnel (Crew Chiefs):

(1) This was one of the main reasons for our survey. Exposure data is needed so further toxicological studies can be done. Not very much information is available concerning the exhaust combustion by-products for different types of aircraft engines. For aircraft configuration see attachment 4.

(2) Breathing zone air samples were taken for aldehydes, VM & P naphtha, benzene, toluene, xylene, nitrogen dioxide, and polyaromatic hydrocarbons, polynuclear aromatic hydrocarbons (PNA/PAHs). These samples were taken during the preflight aircraft run-ups at 0830 and 1230 hours. The VM & P naphtha, benzene, toluene, and xylene all revealed none detected levels. The sampling times ranged from 21 to 45 minutes. One worker had a breathing zone air sample for acetaldehyde which measured 0.00022 mg/m^3. This is well below the ceiling OEL of 45 mg/m^3. Low levels of acenaphthene and acenaphtylene were detected during the PNA/PHA sample analysis. However, no OEL is currently established for these two chemicals.

f. Engine Exhaust Samples: Area samples were taken from the aircraft engine exhaust stream during run-up for both JP-8 and JP-8 + 100 fueled aircrafts. The samples were collected at a distance of 60 feet from the tail of the F-16 and approximately 5 feet to the right of the aircraft center line. See attachment 3. This was to account for the wind effects on the exhaust stream. Both fuels were sampled in order to directly compare the two fuels exhaust streams. Samples for aldehydes, VM & P naphtha, benzene, toluene, hexane, xylene, nitrogen dioxide, PNA/PHAs, and summa canister samples were collected. The summa canister samples are used as a qualitative test to determine which chemicals are present and approximate the chemical concentration.

(1) JP-8 Jet Fuel: VM & P naphtha, benzene, toluene, xylene, PNA/PAHs, and hexane all measured none detected. All of the aldehydes were none detected except for acetaldehyde (0.00031 mg/m^3) and formaldehyde (0.00125 mg/m^3). Both were well below the OEL for each chemical. The nitrogen dioxide measurement revealed a level of 0.00038 mg/m^3. This is below the ceiling exposure limit of 1.8 mg/m^3. The summa canister sample revealed numerous chemicals which were found in the exhaust stream. All were below the established OELs. See the sample results at attachment 1, Summa Canister #2.

(2) JP-8 + 100 Jet Fuel: VM & P naphtha, benzene, toluene, xylene, hexane, and PNA/PAHs all measured none detected. All of the aldehydes were none detected except for acetaldehyde (0.0003 mg/m^3) and formaldehyde (0.00063 mg/m^3). This formaldehyde level is 50 percent lower than the formaldehyde level measured with JP-8. The nitrogen dioxide level measured was 0.00125 mg/m^3. This level was 30 percent greater for JP-8 + 100 than JP-8. Both the aldehydes and nitrogen dioxide are well below their OELs. The summa canister sample revealed numerous chemicals which were found in the exhaust stream of

both the JP-8 and JP-8 + 100 fuels except methylene chloride. This chemical was at least 70 percent higher in the JP-8 + 100 fuel than in the JP-8 jet fuel. It probably comes from the additives used in the + 100 jet fuel. This level is below the OEL for methylene chloride, however it is a suspect carcinogen which needs to be closely monitored to ensure safe use. See the sample results at attachment 1, Summa Canister #1.

(3) JP-8 vs. JP-8 + 100 Jet Fuel: Table 2 gives a side-by-side comparison of both JP-8 and JP-8 + 100 jet fuels. Most of the results are relatively close. However, methylene chloride is at least 70 percent higher in JP-8 + 100. Several other chlorinated hydrocarbons were detected as well; the extremely low concentration could be from impurities picked up in the refining process, fuel transport systems or the additives. The manufacturer of the additive has cited propietary secrets and has made it difficult to determine their entire formulation. From what we were given, it does not appear that methylene chloride is an intentional additive. See the rest of the sample results and percent difference in Table 2.

Table 2.
Comparison of JP-8 and JP-8 Plus 100 area samples (raw results) using Summa Canisters at Kingsley Field with F-16 aircraft.

COMPOUND	OEL (mg/m^3)	JP-8 RESULT (ug/m^3)	JP-8 PLUS 100 RESULT (ug/m^3)	PERCENT DIFFERENCE (+/-) JP-8 vs JP-8 Plus 100
Chloromethane	103.0	1.3	1.4	+ 7.7%
Acetone	1780.0	43.0	58.0	+ 34.9%
Trichlorofluoromethane	5620.0 C[2]	1.6	2.0	+ 25.0%
Methylene Chloride	174.0	ND (1.0)	1.7	+ 70.0%
2-Butanone	590.0	5.2	7.2	+ 38.5%
1,1,1 Trichloroethane	1900.0	0.74	1.0	+ 35.1%
Benzene	3.0	53.0	59.0	+ 11.3%
Toluene	188.0	20.0	24.0	+ 20.0%
Ethylbenzene	434.0	4.5	4.2	- 6.7%
m-& p-Xylene	434.0	12.0	11.0	- 8.3%
Styrene	213.0	13.0	14.0	+ 7.7%
o-Xylene	434.0	4.9	4.7	- 4.1%
1,2-Dichlorobenzene	150.0	1.8	ND (1.0)	- 44.4%

[2] Denotes ceiling value.

(4) One interesting observation during this assessment is the F-16 exhaust stream (JP-8 or JP-8 + 100) does not contain the same irritating effects as were observed during the Reno ANG assessment with RF-4s. This is probably due to more efficient combustion in F-16 engines.

6. Follow-up Actions/Recommendations:

For Kingsly Field:

a. The run-up room in the AGE shop is effectively removing exhaust contaminants from the room. Continue to use this room as needed to protect workers from bad weather and exhaust gases. In addition, workers are not being over-exposed during generator run-ups outside. Current work practices are controlling workers exposures.

b. More emphasis needs to be placed on wearing PPE in the Jet Engine shop. Workers should be required to wear tight fitting gloves (nitrile or neoprene) when their hands are exposed to liquid jet fuel. One possible 100% nitrile glove is manufactured by Best MFG, Company, N-Dex gloves, style #8005. Since JP-8 + 100 does not evaporate as quickly as JP-4, workers around the Air Force have been experiencing increased cases of chemical dermatitis or chemical burns. The Magic Glove barrier cream should only be used for short duration operations which require additional dexterity. Workers are reminded to wear splash-proof goggles and/or a face shield when working in and around liquid jet fuel.

c. MSgt Bixler has agreed to do some sampling in the Fuel Cell shop for VM & P naphtha, benzene and butylated hydroxytoluene (BHT) when work comes in to ensure workers are not being overexposed.

d. MSgt Bixler also plans to do some sampling in the POL shop for butylated hydroxytoluene (BHT) when workers are checking the fluid level in the additive injector pump and refueling the transporters. This operation will take approximately 15 minutes.

For AL/OET:

e. After talking with the engine repair personnel and observing the engine exhaust, it is apparent that JP-8 Plus 100 burns more cleanly than JP-8. The carbon black buildup is greatly decreased. However, the source of the methylene chloride and other chlorinated hydrocarbons should be investigated and determine if they can feasibly be eliminated from the fuel.

7. We appreciate the opportunity to evaluate the occupational health concerns for the new JP-8 + 100 jet fuel. We want to thank Maj Elvin and his maintenance personnel for the quick work they did in getting the JP-8 aircraft operational so the exhaust comparision study could be conducted. The results of this study are of interest DoD-wide and will help in our understanding of the health hazards associated with this new jet fuel. If you have any questions, please contact Capt Bell at DSN 240-6140, or TSgt Lazenby at DSN 240-6141.

Mark H. Stokes

MARK H. STOKES, Col, USAF, BSC
Chief, Occupational Medicine Division

Attachments:
1. Sample Results
2. Weather Conditions
3. Aircraft Sampling Diagram
4. Ramp Configuration

cc: US Navy Bethesda MD
114 FS/SGPB
207 Gentile St, Suite 20
Klamath Falls, OR 97603-1918

ALDEHYDES - AREA SAMPLES

DATE	EVENT SAMPLED	CONTAMINANT	TIME	RESULTS - TWA (MG/M3)	SAMPLE #
950522	GENERATOR RUN-UP	ACETALDEHYDE	32 MIN	< 0.00004	SY950062
	AGE SHOP/ JP8+100	ACROLEIN	32 MIN	< 0.00067	SY950062
	1 FT FROM EXHAUST	BUTYRALDEHYDE	32 MIN	< 0.00067	SY950062
	OUTDOORS	CROTONALDEHYDE	32 MIN	< 0.00067	SY950062
		FORMALDEHYDE	32 MIN	0.00007	SY950062
		FURFURAL	32 MIN	< 0.00067	SY950062
		HEPTANAL	32 MIN	< 0.00067	SY950062
		HEXANAL	32 MIN	< 0.00067	SY950062
		ISOBUTYRALDEHYDE	32 MIN	< 0.00067	SY950062
		ISOVALERALDEHYDE	32 MIN	< 0.00067	SY950062
		PROPIONALDEHYDE	32 MIN	< 0.00067	SY950062
		VALERALDEHYDE	32 MIN	< 0.00067	SY950062
950522	GENERATOR RUN-UP	ACETALDEHYDE	32 MIN	< 0.00004	SY950065
	AGE SHOP/JP-8 +100	ACROLEIN	32 MIN	< 0.00067	SY950065
	4 FT FROM EXHAUST	BUTYRALDEHYDE	32 MIN	< 0.00067	SY950065
	INDOORS (12'x12'x12')	CROTONALDEHYDE	32 MIN	< 0.00067	SY950065
		FORMALDEHYDE	32 MIN	< 0.00004	SY950065
		FURFURAL	32 MIN	< 0.00067	SY950065
		HEPTANAL	32 MIN	< 0.00067	SY950065
		HEXANAL	32 MIN	< 0.00067	SY950065
		ISOBUTYRALDEHYDE	32 MIN	< 0.00067	SY950065
		ISOVALERALDEHYDE	32 MIN	< 0.00067	SY950065
		PROPIONALDEHYDE	32 MIN	< 0.00067	SY950065
		VALERALDEHYDE	32 MIN	< 0.00067	SY950065
950523	ENGINE RUN-UP	ACETALDEHYDE	30 MIN	0.0003	SY950073
	FLIGHTLINE F-16	ACROLEIN	30 MIN	< 0.00063	SY950073
	OUTDOORS	BUTYRALDEHYDE	30 MIN	< 0.00063	SY950073
	60 FT FROM EXHAUST	CROTONALDEHYDE	30 MIN	< 0.00063	SY950073
	JP8 + 100 FUEL	FORMALDEHYDE	30 MIN	0.00063	SY950073
		FURFURAL	30 MIN	< 0.00063	SY950073
		HEPTANAL	30 MIN	< 0.00063	SY950073
		HEXANAL	30 MIN	< 0.00063	SY950073
		ISOBUTYRALDEHYDE	30 MIN	< 0.00063	SY950073
		ISOVALERALDEHYDE	30 MIN	< 0.00063	SY950073
		PROPIONALDEHYDE	30 MIN	< 0.00063	SY950073
		VALERALDEHYDE	30 MIN	< 0.00063	SY950073

ALDEHYDES - AREA SAMPLE

DATE	EVENT SAMPLED	CONTAMINANT	TIME	RESULTS - TWA (MG/M3)	SAMPLE #
950524	ENGINE RUN-UP	ACETALDEHYDE	30 MIN	0.00031	SY950095
	FLIGHTLINE F-16	ACROLEIN	30 MIN	< 0.00063	SY950095
	OUTDOORS	BUTYRALDEHYDE	30 MIN	< 0.00063	SY950095
	60 FT FROM EXHAUST	CROTONALDEHYDE	30 MIN	< 0.00063	SY950095
	JP-8 FUEL	FORMALDEHYDE	30 MIN	0.00125	SY950095
		FURFURAL	30 MIN	< 0.00063	SY950095
		HEPTANAL	30 MIN	< 0.00063	SY950095
		HEXANAL	30 MIN	< 0.00063	SY950095
		ISOBUTYRALDEHYDE	30 MIN	< 0.00063	SY950095
		ISOVALERALDEHYDE	30 MIN	< 0.00063	SY950095
		PROPIONALDEHYDE	30 MIN	< 0.00063	SY950095
		VALERALDEHYDE	30 MIN	< 0.00063	SY950095

MISC. ORGANICS - AREA SAMPLES

DATE	EVENT SAMPLED	CONTAMINANT	TIME	RESULTS - TWA (MG/M3)	SAMPLE NUMBER
950522	GENERATOR RUN-UP	VM&P NAPHTHA	32 MIN	< 0.0104	SY950060
	AGE SHOP/JP8+100				
	1 FT FROM EXHAUST	BENZENE	32 MIN	< 0.0011	SY950060
	OUTDOORS				
950522	GENERATOR RUN-UP	VM&P NAPHTHA	32 MIN	< 0.0104	SY950063
	AGE SHOP/JP8 FUEL				
	4 FT FROM EXHAUST	BENZENE	32 MIN	< 0.0011	SY950063
	INDOORS (12'x12'x12')				
950523	ENGINE RUN-UP	VM&P NAPHTHA	30 MIN	< 0.0104	SY950070
	FLIGHTLINE F-16				
	OUTDOORS	BENZENE	30 MIN	< 0.0011	SY950070
	60 FT FROM EXHAUST				
	JP8 +100 FUEL	TOLUENE	30 MIN	< 0.0011	SY950070
		XYLENE	30 MIN	< 0.0011	SY950070
		HEXANE	30 MIN	< 0.0011	SY950070
950524	ENGINE RUN-UP	VM&P NAPHTHA	30 MIN	< 0.0104	SY950096
	FLIGHTLINE F-16				
	OUTDOORS	BENZENE	30 MIN	< 0.0011	SY950096
	60 FT FROM EXHAUST				
	JP-8 FUEL	TOLUENE	30 MIN	< 0.0011	SY950096
		XYLENE	30 MIN	< 0.0011	SY950096
		HEXANE	30 MIN	< 0.0011	SY950096

PAH-PNA - AREA SAMPLES

DATE	EVENT SAMPLED	CONTAMINANT	TIME	RESULTS - TWA (MG/M3)	SAMPLE NUMBER
950522	GENERATOR RUN-UP	ACENAPHTHENE	32 MIN	< 0.0004	SY950061
	AGE SHOP/JP8+100	ACENAPHTYLENE	32 MIN	< 0.0004	SY950061
	1 FT FROM EXHAUST	ANTHRACENE	32 MIN	< 0.0004	SY950061
	OUTDOORS	BENZO(A)ANTHRACENE	32 MIN	< 0.00001	SY950061
		BENZO(A)PYRENE	32 MIN	< 0.00001	SY950061
		BENZO(B)FLUORANTHENE	32 MIN	< 0.00001	SY950061
		BENZO(GHI)PERYLENE	32 MIN	< 0.00004	SY950061
		BENZO(K)FLUORANTHENE	32 MIN	< 0.00001	SY950061
		CHRYSENE	32 MIN	< 0.0001	SY950061
		DIBENZO(A,H)ANTHRACENE	32 MIN	< 0.00002	SY950061
		FLUORANTHENE	32 MIN	< 0.00001	SY950061
		FLUORENE	32 MIN	< 0.00001	SY950061
		INDENO(123-CD)PYRENE	32 MIN	< 0.00002	SY950061
		NAPHTHALENE	32 MIN	< 0.00007	SY950061
		PHENANTHRENE	32 MIN	< 0.00006	SY950061
		PYRENE	32 MIN	< 0.0002	SY950061
950522	GENERATOR RUN-UP	ACENAPHTHENE	32 MIN	< 0.0004	SY950064
	AGE SHOP/JP8 FUEL	ACENAPHTYLENE	32 MIN	< 0.0004	SY950064
	4 FT FROM EXHAUST	ANTHRACENE	32 MIN	< 0.0004	SY950064
	INDOORS (12'x12'x12')	BENZO(A)ANTHRACENE	32 MIN	< 0.00001	SY950064
		BENZO(A)PYRINE	32 MIN	< 0.00001	SY950064
		BENZO(B)FLUORANTHENE	32 MIN	< 0.00001	SY950064
		BENZO(GHI)PERYLENE	32 MIN	< 0.00004	SY950064
		BENZO(K)FLUORANTHENE	32 MIN	< 0.00001	SY950064
		CHRYSENE	32 MIN	< 0.0001	SY950064
		DIBENZO(A,H)ANTHRACENE	32 MIN	< 0.00002	SY950064
		FLUORANTHENE	32 MIN	< 0.00001	SY950064
		FLUORENE	32 MIN	< 0.00001	SY950064
		INDENO(123-CD)PYRENE	32 MIN	< 0.00002	SY950064
		NAPHTHALENE	32 MIN	< 0.00007	SY950064
		PHENANTHRENE	32 MIN	< 0.00006	SY950064
		PYRENE	32 MIN	< 0.0002	SY950064

PAH PNA - AREA SAMPLES

DATE	EVENT SAMPLED	CONTAMINANT	TIME	RESULTS - TWA (MG/M3)	SAMPLE NUMBER
950523	ENGINE RUN-UP	ACENAPHTHENE	30 MIN	< 0.0004	SY950072
	FLIGHTLINE F-16	ACENAPHTYLENE	30 MIN	< 0.0004	SY950072
	OUTDOORS	ANTHRACENE	30 MIN	< 0.0004	SY950072
	60 FT FROM EXHAUST	BENZO(A)ANTHRACENE	30 MIN	< 0.00001	SY950072
	JP8 + 100 FUEL	BENZO(A)PYRENE	30 MIN	< 0.00001	SY950072
		BENZO(B)FLUORANTHENE	30 MIN	< 0.00001	SY950072
		BENZO(GHI)PERYLENE	30 MIN	< 0.00004	SY950072
		BENZO(K)FLUORANTHENE	30 MIN	< 0.00001	SY950072
		CHRYSENE	30 MIN	< 0.0001	SY950072
		DIBENZO(A,H)ANTHRACENE	30 MIN	< 0.00001	SY950072
		FLUORANTHENE	30 MIN	< 0.00001	SY950072
		FLUORENE	30 MIN	< 0.00001	SY950072
		INDENO(123-CD)PYRENE	30 MIN	< 0.00002	SY950072
		NAPHTHALENE	30 MIN	< 0.0004	SY950072
		PHENANTHRENE	30 MIN	< 0.00006	SY950072
		PYRENE	30 MIN	< 0.0002	SY950072
950522	ENGINE RUN-UP	ACENAPHTHENE	30 MIN	< 0.0004	SY950094
	FLIGHTLINE F-16	ACENAPHTYLENE	30 MIN	< 0.0004	SY950094
	OUTDOORS	ANTHRACENE	30 MIN	< 0.0004	SY950094
	60 FT FROM EXHAUST	BENZO(A)ANTHRACENE	30 MIN	< 0.00001	SY950094
	JP-8 FUEL	BENZO(A)PYRINE	30 MIN	< 0.00001	SY950094
		BENZO(B)FLUORANTHENE	30 MIN	< 0.00001	SY950094
		BENZO(GHI)PERYLENE	30 MIN	< 0.00004	SY950094
		BENZO(K)FLUORANTHENE	30 MIN	< 0.00001	SY950094
		CHRYSENE	30 MIN	< 0.0001	SY950094
		DIBENZO(A,H)ANTHRACENE	30 MIN	< 0.00002	SY950094
		FLUORANTHENE	30 MIN	< 0.00001	SY950094
		FLUORENE	30 MIN	< 0.00001	SY950094
		INDENO(123-CD)PYRENE	30 MIN	< 0.00002	SY950094
		NAPHTHALENE	30 MIN	< 0.0004	SY950094
		PHENANTHRENE	30 MIN	< 0.00006	SY950094
		PYRENE	30 MIN	< 0.0002	SY950094

NITROGEN DIOXIDE - ALL SAMPLES

DATE	EVENT SAMPLED	CONTAMINANT	TIME	RESULTS - TWA (MG/M3)	SAMPLE NUMBER
950523	ENGINE RUN-UP	NITROGEN DIOXIDE	30 MIN	0.00125	SY950069
	FLIGHTLINE F-16				
	OUTDOORS/JP8+100				
	60 FT FROM EXHAUST				
950524	ENGINE RUN-UP	NITROGEN DIOXIDE	30 MIN	0.00038	SY950097
	FLIGHTLINE F-16				
	OUTDOORS/ JP8 FUEL				
	60 FT FROM EXHAUST				
950523	ENGINE RUN-UP	NITROGEN DIOXIDE	35 MIN	< 0.000015	SZ950080
	FLIGHTLINE F-16				
	CREW CHIEF				
	561-51-6575				
	OUTDOORS/ JP8 + 100				
950523	ENGINE RUN-UP	NITROGEN DIOXIDE	21 MIN	< 0.00002	SZ950081
	FLIGHTLINE F-16				
	CREW CHIEF				
	554-72-5365				
	OUTDOORS/ JP8 + 100				

ALDEHYDES - PERSONNEL SAMPLES

DATE	EVENT SAMPLED	CONTAMINANT	TIME	RESULTS - TWA (MG/M3)	SAMPLE #
950523	ENGINE RUN-UP	ACETALDEHYDE	28 MIN	< 0.00004	SZ950074
	FLIGHTLINE F-16	ACROLEIN	28 MIN	< 0.00058	SZ950074
	CREW CHIEF	BUTYRALDEHYDE	28 MIN	< 0.00058	SZ950074
	386-74-7636	CROTONALDEHYDE	28 MIN	< 0.00058	SZ950074
	JP8 + 100 FUEL	FORMALDEHYDE	28 MIN	< 0.00004	SZ950074
		FURFURAL	28 MIN	< 0.00058	SZ950074
		HEPTANAL	28 MIN	< 0.00058	SZ950074
		HEXANAL	28 MIN	< 0.00058	SZ950074
		ISOBUTYRALDEHYDE	28 MIN	< 0.00058	SZ950074
		ISOVALERALDEHYDE	28 MIN	< 0.00058	SZ950074
		PROPIONALDEHYDE	28 MIN	< 0.00058	SZ950074
		VALERALDEHYDE	28 MIN	< 0.00058	SZ950074
950523	ENGINE RUN-UP	ACETALDEHYDE	21 MIN	0.00022	SZ950075
	FLIGHTLINE F-16	ACROLEIN	21 MIN	< 0.00088	SZ950075
	CREW CHIEF	BUTYRALDEHYDE	21 MIN	< 0.00088	SZ950075
	554-72-5365	CROTONALDEHYDE	21 MIN	< 0.00088	SZ950075
	JP8 + 100 FUEL	FORMALDEHYDE	21 MIN	< 0.00175	SZ950075
		FURFURAL	21 MIN	< 0.00088	SZ950075
		HEPTANAL	21 MIN	< 0.00088	SZ950075
		HEXANAL	21 MIN	< 0.00088	SZ950075
		ISOBUTYRALDEHYDE	21 MIN	< 0.00088	SZ950075
		ISOVALERALDEHYDE	21 MIN	< 0.00088	SZ950075
		PROPIONALDEHYDE	21 MIN	< 0.00088	SZ950075
		VALERALDEHYDE	21 MIN	< 0.00088	SZ950075

PAH-PNA - PERSONNEL SAMPLES

DATE	EVENT SAMPLED	CONTAMINANT	TIME	RESULTS - TWA (MG/M3)	SAMPLE NUMBER
950523	ENGINE RUN-UP	ACENAPHTHENE	28 MIN	0.00117	SZ950076
	FLIGHTLINE F-16	ACENAPHTYLENE	28 MIN	0.00058	SZ950076
	CREW CHIEF	ANTHRACENE	28 MIN	< 0.00041	SZ950076
	543-76-9434	BENZO(A)ANTHRACENE	28 MIN	< 0.00001	SZ950076
	JP8 + 100 FUEL	BENZO(A)PYRENE	28 MIN	< 0.00001	SZ950076
		BENZO(B)FLUORANTHENE	28 MIN	< 0.00001	SZ950076
		BENZO(GHI)PERYLENE	28 MIN	< 0.00004	SZ950076
		BENZO(K)FLUORANTHENE	28 MIN	< 0.00001	SZ950076
		CHRYSENE	28 MIN	< 0.0001	SZ950076
		DIBENZO(A,H)ANTHRACENE	28 MIN	< 0.00002	SZ950076
		FLUORANTHENE	28 MIN	< 0.0001	SZ950076
		FLUORENE	28 MIN	< 0.0001	SZ950076
		INDENO(123-CD)PYRENE	28 MIN	< 0.00002	SZ950076
		NAPHTHALENE	28 MIN	< 0.00006	SZ950076
		PHENANTHRENE	28 MIN	< 0.00006	SZ950076
		PYRENE	28 MIN	< 0.0002	SZ950076
950523	ENGINE RUN-UP	ACENAPHTHENE	29 MIN	< 0.00042	SZ950077
	FLIGHTLINE F-16	ACENAPHTYLENE	29 MIN	< 0.00042	SZ950077
	CREW CHIEF	ANTHRACENE	29 MIN	< 0.00042	SZ950077
	573-11-8834	BENZO(A)ANTHRACENE	29 MIN	< 0.00001	SZ950077
	JP8 + 100 FUEL	BENZO(A)PYRINE	29 MIN	< 0.00001	SZ950077
		BENZO(B)FLUORANTHENE	29 MIN	< 0.00001	SZ950077
		BENZO(GHI)PERYLENE	29 MIN	< 0.00004	SZ950077
		BENZO(K)FLUORANTHENE	29 MIN	< 0.00001	SZ950077
		CHRYSENE	29 MIN	< 0.0001	SZ950077
		DIBENZO(A,H)ANTHRACENE	29 MIN	< 0.00002	SZ950077
		FLUORANTHENE	29 MIN	< 0.0001	SZ950077
		FLUORENE	29 MIN	< 0.0001	SZ950077
		INDENO(123-CD)PYRENE	29 MIN	< 0.00002	SZ950077
		NAPHTHALENE	29 MIN	< 0.00006	SZ950077
		PHENANTHRENE	29 MIN	< 0.00006	SZ950077
		PYRENE	29 MIN	< 0.0002	SZ950077

PAH-PNA - PERSONNEL SAMPLE

DATE	EVENT SAMPLED	CONTAMINANT	TIME	RESULTS - TWA (MG/M3)	SAMPLE NUMBER
950522	ENGINE RUN-UP	ACENAPHTHENE	30 MIN	< 0.0004	SZ950067
	AGE SHOP/JP8 FUEL	ACENAPHTYLENE	30 MIN	< 0.0004	SZ950067
	PERSONNEL EXPOSU	ANTHRACENE	30 MIN	< 0.0004	SZ950067
	542-72-4342	BENZO(A)ANTHRACENE	30 MIN	< 0.00001	SZ950067
	INDOORS (12'x12'x12')	BENZO(A)PYRENE	30 MIN	< 0.00001	SZ950067
		BENZO(B)FLUORANTHENE	30 MIN	< 0.00001	SZ950067
		BENZO(GHI)PERYLENE	30 MIN	< 0.00004	SZ950067
		BENZO(K)FLUORANTHENE	30 MIN	< 0.00001	SZ950067
		CHRYSENE	30 MIN	< 0.0001	SZ950067
		DIBENZO(A,H)ANTHRACENE	30 MIN	< 0.00002	SZ950067
		FLUORANTHENE	30 MIN	< 0.00013	SZ950067
		FLUORENE	30 MIN	< 0.00013	SZ950067
		INDENO(123-CD)PYRENE	30 MIN	< 0.00002	SZ950067
		NAPHTHALENE	30 MIN	< 0.00006	SZ950067
		PHENANTHRENE	30 MIN	< 0.00006	SZ950067
		PYRENE	30 MIN	< 0.0002	SZ950067

MISC. ORGANICS - PERSONNEL

DATE	EVENT SAMPLED	CONTAMINANT	TIME	RESULTS - TWA (MG/M3)	SAMPLE NUMBER
950522	ENGINE RUN-UP	VM&P NAPHTHA	30 MIN	< 0.0104	SZ950066
	AGE SHOP/ JP-8 FUEL				
	PERSONNEL EXPOSURE	BENZENE	30 MIN	< 0.0011	SZ950066
	544-84-3339				
950523	ENGINE RUN-UP	VM&P NAPHTHA	32 MIN	< 0.0104	SZ950078
	FLIGHTLINE F-16	BENZENE	32 MIN	< 0.0011	SZ950078
	CREW CHIEF	TOLUENE	32 MIN	< 0.0011	SZ950078
	544-72-4145	XYLENE	32 MIN	< 0.0011	SZ950078
	OUTDOORS	HEXANE	32 MIN	< 0.0011	SZ950078
950523	ENGINE RUN-UP	VM&P NAPHTHA	27 MIN	< 0.0104	SZ950079
	FLIGHTLINE F-16	BENZENE	27 MIN	< 0.0011	SZ950079
	CREW CHIEF	TOLUENE	27 MIN	< 0.0011	SZ950079
	573-64-0573	XYLENE	27 MIN	< 0.0011	SZ950079
	OUTDOORS	HEXANE	27 MIN	< 0.0011	SZ950079
950523	FUEL OFF-LOADING	VM&P NAPHTHA	27 MIN	< 0.0104	SZ950084
	2 TRANSPORTERS	BENZENE	27 MIN	< 0.0011	SZ950084
	OUTDOORS	TOLUENE	27 MIN	< 0.0011	SZ950084
	PERSONNEL EXPOSURE	XYLENE	27 MIN	< 0.0011	SZ950084
	541-94-2472	HEXANE	27 MIN	< 0.0011	SZ950084
950523	FUEL OFF-LOADING	VM&P NAPHTHA	27 MIN	< 0.0104	SZ950085
	2 TRANSPORTERS	BENZENE	27 MIN	< 0.0011	SZ950085
	OUTDOORS	TOLUENE	27 MIN	< 0.0011	SZ950085
	PERSONNEL EXPOSURE	XYLENE	27 MIN	< 0.0011	SZ950085
	542-84-5044	HEXANE	27 MIN	< 0.0011	SZ950085

MISC ORGANICS - PERSONNEL

DATE	EVENT SAMPLED	CONTAMINANT	TIME	RESULTS - TWA (MG/M3)	SAMPLE NUMBER
950524	ENGINE RUN-UP	VM&P NAPHTHA	32 MIN	< 0.0104	SZ950086
	FLIGHTLINE F-16	BENZENE	32 MIN	< 0.0011	SZ950086
	CREW CHIEF	TOLUENE	32 MIN	< 0.0011	SZ950086
	554-72-5365	XYLENE	32 MIN	< 0.0011	SZ950086
	OUTDOORS/JP8 + 100	HEXANE	32 MIN	< 0.0011	SZ950086
950524	ENGINE RUN-UP	VM&P NAPHTHA	35 MIN	< 0.0104	SZ950087
	FLIGHTLINE F-16	BENZENE	35 MIN	< 0.0010	SZ950087
	CREW CHIEF	TOLUENE	35 MIN	< 0.0010	SZ950087
	507-88-7072	XYLENE	35 MIN	< 0.0010	SZ950087
	OUTDOORS/JP8 + 100	HEXANE	35 MIN	< 0.0010	SZ950087
950524	ENGINE RUN-UP	VM&P NAPHTHA	21 MIN	< 0.0104	SZ950088
	FLIGHTLINE F-16	BENZENE	21 MIN	< 0.0011	SZ950088
	CREW CHIEF	TOLUENE	21 MIN	< 0.0011	SZ950088
	519-92-4311	XYLENE	21 MIN	< 0.0011	SZ950088
	OUTDOORS/JP8 + 100	HEXANE	21 MIN	< 0.0011	SZ950088
950524	ENGINE RUN-UP	VM&P NAPHTHA	45 MIN	< 0.0104	SZ950089
	FLIGHTLINE F-16	BENZENE	45 MIN	< 0.0010	SZ950089
	CREW CHIEF	TOLUENE	45 MIN	< 0.0010	SZ950089
	573-11-8834	XYLENE	45 MIN	< 0.0010	SZ950089
	OUTDOORS/JP8 + 100	HEXANE	45 MIN	< 0.0010	SZ950089

MISC ORGANIC - PERSONNEL

DATE	EVENT SAMPLED	CONTAMINANT	TIME	RESULTS - TWA (MG/M3)	SAMPLE NUMBER
950524	ENGINE RUN-UP	VM&P NAPHTHA	21 MIN	< 0.0104	SZ950092
	FLIGHTLINE F-16	BENZENE	21 MIN	< 0.0011	SZ950092
	CREW CHIEF	TOLUENE	21 MIN	< 0.0011	SZ950092
	564-27-8883	XYLENE	21 MIN	< 0.0011	SZ950092
	OUTDOORS	HEXANE	21 MIN	< 0.0011	SZ950092
950524	LOADING JP8 + 100	VM&P NAPHTHA	15 MIN	< 0.0104	SZ950099
	INTO TANKERS	BENZENE	15 MIN	< 0.0010	SZ950099
	PERSONNEL EXPOSURE	TOLUENE	15 MIN	< 0.0010	SZ950099
	543-64-8062	XYLENE	15 MIN	< 0.0010	SZ950099
	OUTDOORS	HEXANE	15 MIN	< 0.0010	SZ950099
950524	REFUELING JP8 + 100	VM&P NAPHTHA	48 MIN	< 0.0104	SZ950101
	INTO F-16 AIRCRAFT	BENZENE	48 MIN	< 0.0010	SZ950101
	OUTDOORS	TOLUENE	48 MIN	< 0.0010	SZ950101
	PERSONNEL EXPOSURE	XYLENE	48 MIN	< 0.0010	SZ950101
	544-54-7303	HEXANE	48 MIN	< 0.0010	SZ950101
950524	SAMPLE PULL FROM	VM&P NAPHTHA	15 MIN	< 0.0104	SZ950103
	JP-8 +100 TRANSPORTER	BENZENE	15 MIN	< 0.0010	SZ950103
	OUTDOORS	TOLUENE	15 MIN	< 0.0010	SZ950103
	PERSONNEL EXPOSURE	XYLENE	15 MIN	< 0.0010	SZ950103
	549-70-6202	HEXANE	15 MIN	< 0.0010	SZ950103

SUMMA CANISTER #1

DATE	EVENT SAMPLED/ COMMENTS	CONTAMINANT	RESULTS - TWA (MG/M3)	SAMPLE NUMBER
950523	ENGINE RUN-UP	CHLOROMETHANE	0.0014	GY950068
	FLIGHTLINE/ F-16	VINYL CHLORIDE	NONE DETECTED	GY950068
	OUTDOORS	BROMOMETHANE	NONE DETECTED	GY950068
	60 FT FROM EXHAUST	CHLOROETHANE	NONE DETECTED	GY950068
	JP8 + 100 FUEL	ACETONE	0.058	GY950068
		TRICHLOROFLUOROMETHANE	0.002	GY950068
		1,1- DICHLOROETHENE	NONE DETECTED	GY950068
		METHYLENE CHLORIDE	0.0017	GY950068
		TRICHLOROTRIFLUOROETHANE	NONE DETECTED	GY950068
		CARBON DISULFIDE	0.0017	GY950068
		trans- 1,2- DICHLOROETHENE	NONE DETECTED	GY950068
		1,1-DICHLOROETHANE	NONE DETECTED	GY950068
		METHYL TERT-BUTYL ETHER	NONE DETECTED	GY950068
		VINYL ACETATE	NONE DETECTED	GY950068
		2- BUTANONE	0.0072	GY950068
		cis-1,2-DICHLOROETHENE	NONE DETECTED	GY950068
		CHLOROFORM	NONE DETECTED	GY950068
		1,2-DICHLOROETHANE	NONE DETECTED	GY950068
		1,1,1,-TRICHLOROETHANE	0.001	GY950068
		BENZENE	0.059	GY950068
		CARBON TETRACHLORIDE	NONE DETECTED	GY950068
		1,2-DICHLOROPROPANE	NONE DETECTED	GY950068
		BROMODICHLOROMETHANE	NONE DETECTED	GY950068
		TRICHLOROETHENE	NONE DETECTED	GY950068
		cis-1,3-DICHLOROPROPENE	NONE DETECTED	GY950068
		4-METHYL-2-PENTANONE	NONE DETECTED	GY950068
		trans-1,3-DICHLOROPROPENE	NONE DETECTED	GY950068
		1,1,2- TRICHLOROETHANE	NONE DETECTED	GY950068
		TOLUENE	0.024	GY950068
		2-HEXANONE	NONE DETECTED	GY950068
		DIBROMOCHLOROMETHANE	NONE DETECTED	GY950068
		1,2-DIBROMOETHANE	NONE DETECTED	GY950068
		TETRACHLOROETHENE	NONE DETECTED	GY950068
		CHLOROBENZENE	NONE DETECTED	GY950068
		ETHYLBENZENE	0.0042	GY950068
		m- &p-XYLENE	0.011	GY950068
		BROMOFORM	NONE DETECTED	GY950068
		STYRENE	0.014	GY950068
		o-XYLENE	0.0047	GY950068
		1,1,2,2-TETRACHLOROETHANE	NONE DETECTED	GY950068
		1,3- DICHLOROBENZENE	NONE DETECTED	GY950068
		1,4-DICHLOROBENZENE	NONE DETECTED	GY950068
		1,2-DICHLOROBENZENE	NONE DETECTED	GY950068

SUMMA CANISTER #2

DATE	EVENT SAMPLED	CONTAMINANT	RESULTS - TWA (MG/M3)	SAMPLE NUMBER
950524	ENGINE RUN-UP	CHLOROMETHANE	0.0013	GY950093
	FLIGHTLINE/ F-16	VINYL CHLORIDE	NONE DETECTED	GY950093
	OUTDOORS	BROMOMETHANE	NONE DETECTED	GY950093
	60 FT FROM EXHAUST	CHLOROETHANE	NONE DETECTED	GY950093
	JP-8 FUEL	ACETONE	0.043	GY950093
		TRICHLOROFLUOROMETHANE	0.0016	GY950093
		1,1- DICHLOROETHENE	NONE DETECTED	GY950093
		METHYLENE CHLORIDE	NONE DETECTED	GY950093
		TRICHLOROTRIFLUOROETHANE	NONE DETECTED	GY950093
		CARBON DISULFIDE	0.0049	GY950093
		trans- 1,2- DICHLOROETHENE	NONE DETECTED	GY950093
		1,1-DICHLOROETHANE	NONE DETECTED	GY950093
		METHYL TERT-BUTYL ETHER	NONE DETECTED	GY950093
		VINYL ACETATE	NONE DETECTED	GY950093
		2- BUTANONE	0.0052	GY950093
		cis-1,2-DICHLOROETHENE	NONE DETECTED	GY950093
		CHLOROFORM	NONE DETECTED	GY950093
		1,2-DICHLOROETHANE	NONE DETECTED	GY950093
		1,1,1,-TRICHLOROETHANE	0.00074	GY950093
		BENZENE	0.053	GY950093
		CARBON TETRACHLORIDE	NONE DETECTED	GY950093
		1,2-DICHLOROPROPANE	NONE DETECTED	GY950093
		BROMODICHLOROMETHANE	NONE DETECTED	GY950093
		TRICHLOROETHENE	NONE DETECTED	GY950093
		cis-1,3-DICHLOROPROPENE	NONE DETECTED	GY950093
		4-METHYL-2-PENTANONE	NONE DETECTED	GY950093
		trans-1,3-DICHLOROPROPENE	NONE DETECTED	GY950093
		1,1,2- TRICHLOROETHANE	NONE DETECTED	GY950093
		TOLUENE	0.02	GY950093
		2-HEXANONE	NONE DETECTED	GY950093
		DIBROMOCHLOROMETHANE	NONE DETECTED	GY950093
		1,2-DIBROMOETHANE	NONE DETECTED	GY950093
		TETRACHLOROETHENE	NONE DETECTED	GY950093
		CHLOROBENZENE	NONE DETECTED	GY950093
		ETHYLBENZENE	0.0045	GY950093
		m- &p-XYLENE	0.012	GY950093
		BROMOFORM	NONE DETECTED	GY950093
		STYRENE	0.013	GY950093
		o-XYLENE	0.049	GY950093
		1,1,2,2-TETRACHLOROETHANE	NONE DETECTED	GY950093
		1,3- DICHLOROBENZENE	NONE DETECTED	GY950093
		1,4-DICHLOROBENZENE	NONE DETECTED	GY950093
		1,2-DICHLOROBENZENE	0.0018	GY950093

BLANK SAMPLES- ALL CONTAMINANTS

DATE	CONTAMINANT	EVENT SAMPLED	TIME	RESULTS (MG/M3)	SAMPLE NUMBER
950525	VM&P NAPHTHA	BLANK	N/A	< 0.010	BK950001
	BENZENE	BLANK	N/A	< 0.001	BK950001
	TOLUENE	BLANK	N/A	< 0.001	BK950001
	XYLENE	BLANK	N/A	< 0.001	BK950001
	HEXANE	BLANK	N/A	< 0.001	BK950001
950525	ACENAPHTHENE	BLANK	N/A	N/A *	BK950005
	ACENAPHTYLENE	BLANK	N/A	N/A *	BK950005
	ANTHRACENE	BLANK	N/A	N/A *	BK950005
	BENZO(A)ANTHRACENE	BLANK	N/A	N/A *	BK950005
	BENZO(A)PYRENE	BLANK	N/A	N/A *	BK950005
	BENZO(B)FLUORANTHENE	BLANK	N/A	N/A *	BK950005
	BENZO(GHI)PERYLENE	BLANK	N/A	N/A *	BK950005
	BENZO(K)FLUORANTHENE	BLANK	N/A	N/A *	BK950005
	CHRYSENE	BLANK	N/A	N/A *	BK950005
	DIBENZO(A,H)ANTHRACENE	BLANK	N/A	N/A *	BK950005
	FLUORANTHENE	BLANK	N/A	N/A *	BK950005
	FLUORENE	BLANK	N/A	N/A *	BK950005
	INDENO(123-CD)PYRENE	BLANK	N/A	N/A *	BK950005
	NAPHTHALENE	BLANK	N/A	N/A *	BK950005
	PHENANTHRENE	BLANK	N/A	N/A *	BK950005
	PYRENE	BLANK	N/A	N/A *	BK950005
950525	ACETALDEHYDE	BLANK	N/A	N/A *	BK950004
	ACROLEIN	BLANK	N/A	N/A *	BK950004
	BUTYRALDEHYDE	BLANK	N/A	N/A *	BK950004
	CROTONALDEHYDE	BLANK	N/A	N/A *	BK950004
	FORMALDEHYDE	BLANK	N/A	N/A *	BK950004
	FURFURAL	BLANK	N/A	N/A *	BK950004
	HEPTANAL	BLANK	N/A	N/A *	BK950004
	HEXANAL	BLANK	N/A	N/A *	BK950004
	ISOBUTYRALDEHYDE	BLANK	N/A	N/A *	BK950004
	ISOVALERALDEHYDE	BLANK	N/A	N/A *	BK950004
	PROPIONALDEHYDE	BLANK	N/A	N/A *	BK950004
	VALERALDEHYDE	BLANK	N/A	N/A *	BK950004
950525	NITROGEN DIOXIDE	BLANK	N/A	< 0.0001	BK950003
* - RESULTS ARE LISTED AS "N/A" PER GALSON LABORATORI				IES	

WEATHER CONDITIONS

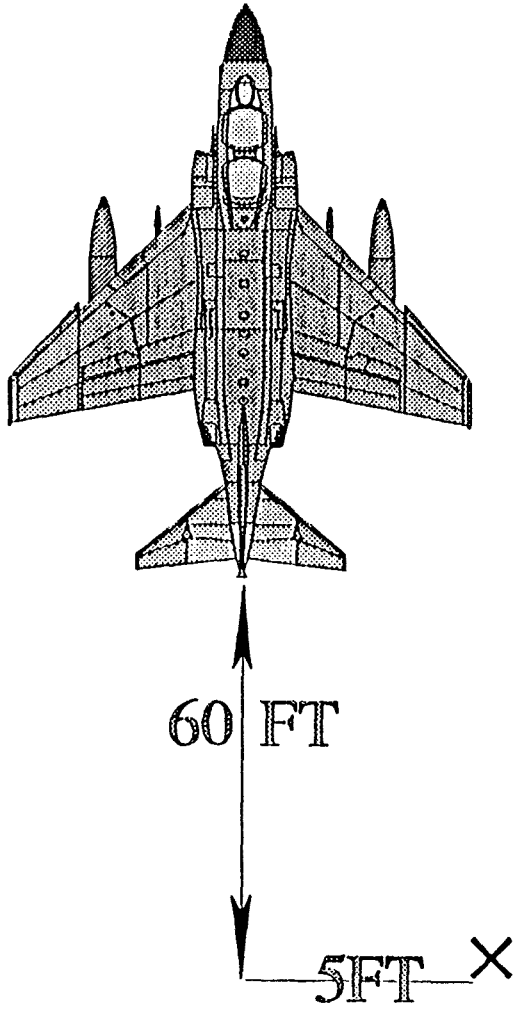
DATE	LOCAL TIME	TEMP	WIND	EVENT SAMPLED	TIME PERIOD
950522	1330 HRS	70° F	34011	ENGINE RUN-UP - AGE SHOP	1319 - 1351 HRS
950522	1430 HRS	70° F	34010	ENGINE RUN-UP - AGE SHOP	1410 - 1442 HRS
950523	0900 HRS	61° F	32006	ENGINE RUN-UP - FLIGHTLINE	0850 - 0920 HRS
950523	1230 HRS	72° F	36004	ENGINE RUN-UP - CREW CHIEFS	1220 - 1325 HRS
950523	1430 HRS	72° F	34010	LOADING FUEL ON TRANSPORTERS	1414 - 1441 HRS
950524	0830 HRS	63° F	32007	ENGINE RUN-UP - CREW CHIEFS	0825 - 0919 HRS
950524	1000 HRS	63° F	34008	ENGINE RUN-UP - FLIGHTLINE	0950 - 1020 HRS
950524	1430 HRS	69° F	34008	LOADING FUEL ONTO TANKER	1359 - 1507 HRS

F - 16 ENGINE EXHAUST STUDY

23 MAY 95

TEMP 61 F

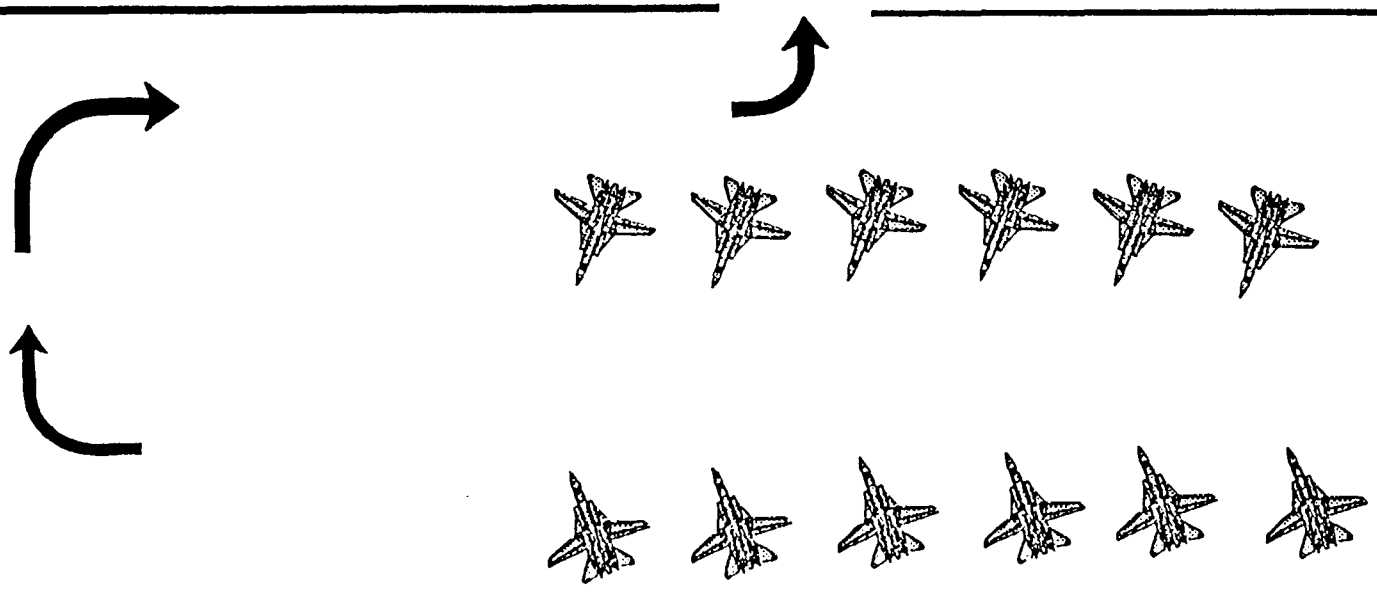
WINDS 7 KNOTS



Atch 3

CURRENT RAMP CONFIGURATION

TAXI WAY



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FIRE STATION

BLDG 216

MAINTENANCE HANGER

BLDG 325